UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

PROXENSE, LLC	)	Civil Action No.: 6:20-cv-879 (ADA)
	)	
Plaintiff,	)	**Jury Trial Requested**
	)	
v.	)	
	)	
TARGET CORPORATION	)	
	)	
Defendant.	)	

DECLARATION OF KURT HUMPHREY

I, Kurt Humphrey, hereby declare as follows:

1) My name is Kurt Humphrey. I have been retained by counsel for Proxense, LLC. to consult and provide technical expertise with respect to issues of claim construction on U.S. Patent No. 10,455,533 ("the '533 Patent"). Specifically, I have been asked to provide my opinion as to how a person having ordinary skill in the art would understand the following claim terms and phrases from those patents:

- "time slot"
- "time slot information"
- "a server configured to receive data from the second wireless device when in proximity to the first wireless device"
- "sending data to a server, when in proximity to the first wireless device"
- "further the server is configured to gather information from the second wireless device"

2) My opinions on these terms and phrases are discussed in detail below. I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called upon to do so, I would testify competently thereto. I understand that willful false statements and the like are punishable by fine or imprisonment, or both.

3) I hold BS and MS degrees in Ceramic Engineering from the University of Missouri-Rolla. Before launching IP Enginuity in 2005, worked for General Motors, AT&T Technologies, N. V. Philips Research Laboratories, United Technologies Microelectronics Center, Rockwell Semiconductor Systems, and TAEUS International for 25 years in the development and analyses of microelectronic devices, ICs, intellectual property and industrial standards and protocols used in wireless and optical telecommunications systems, including analog/digital modems, 3G/4G/5G transceivers, DFB lasers, VCSELs, optical modulators, erbium-doped fiber amplifiers, MIMO/beam-forming antennas, Bluetooth, and 802.11-compliant systems. I have a thorough understanding of wireless telecommunications systems and technology. My thorough understanding comes from both industrial experience and multiple engineering consulting and expert witness engagements. You can find details of my experience in my CV attached as Appendix A.

4) I am a named inventor on a number of patents most of which relate to microelectronics and MEMS technology. A listing of my patents and technical papers are provided in my CV.

5) I am being compensated for my expert witness consulting at $285 per hour. I will be compensated for deposition testimony and court time at $425 per hour. In addition to compensation for my time, I am being reimbursed for reasonable expenses associated with my work. My compensation is not dependent on the outcome of this proceeding, or the content or specifics of any of my opinions, statements or testimony.

6) I have served as an expert witness in 8 other cases:

Civil Actions No. 6:15-cv-00208, 6:15-cv-00209, 6:15-cv-00211, and 6:15-cv-00212

Case No. 16-cv-6830 (Nevro v. Boston Scientific)

Case IPR2017-001889

CAUSE NO. 2009-76645 (Clutch City Sports v. iLight Technologies)

ITC case: 337-TA-606 (Hewett-Packard v. Acer)

7) My opinions are based on my educational background and my substantial experience with 3GPP 3G/4G LTE cellular, 802.11, 802.16, Bluetooth BR/EDR, Bluetooth Low Energy and Bluetooth mesh wireless telecommunications and networking. I also base my opinions on the materials cited throughout this Declaration, including the Patents.

8) I reserve the right to consider additional information that I may not have reviewed yet because it was unavailable at the time I prepared this Declaration. This includes documents or information from Defendant, third-parties, or the Court that come to light in this litigation after this declaration.

9) Although I rely on a number of legal principles in my declaration, I am not an attorney and I do not have a legal background. Counsel for Proxense has provided me with the legal principles contained in this report. I have accepted those principles as binding and my opinions rely on those principles, which are explained below.

10) I understand that claim terms are construed from the perspective of a person of ordinary skill in the art after taking into consideration the teachings of the patent and prosecution history. The person of ordinary skill in the art ("POSITA") is a hypothetical person that is presumed to have existed at the time of the invention that has the capability of understanding the scientific and engineering principles applicable to the pertinent claimed invention. On that basis, it is my opinion a POSITA would have at least a bachelor's degree in engineering, physics, or computer science, and at least 2 year of experience in the design of wireless telecommunications systems or analyses of wireless telecommunications components and familiarity with wireless telecommunications standards.. I meet the requirements of a person having ordinary skill in the art.

11) I have also been informed that a claim is "indefinite" if a POSITA would be unable to determine the scope of the claim with reasonable certainty, after having viewed the patent and prosecution history.

12) I have read the ''533 Patent, and understand its claims and underlying technology.

13) The '533 Patent relates to solving problems that arise in implementing systems for tracking and providing services for wireless telecommunications devices as they move throughout

spaces. Many different wireless telecommunications devices within the same space, each attempting communication at the same time, presents problems of interference and crosstalk, as well as difficulty in sorting out which device is communicating at any given time. Additionally, constant scanning for devices in the system presents problems of excessive power consumption and thus, for battery-powered devices, reduced battery life.

14) To overcome these problems, the ''533 Patent uses one or more reader decoder circuits ("RDCs") placed throughout a space to interact with one or more personal digital keys ("PDKs"), e.g., mobile wireless telecommunications devices such as smartphones, and a server to provide information and/or services. RDCs can communicate with PDKs to track their location as they move through the space, provide services to the PDKs such as via a back-end server, or direct PDKs to access those services themselves.

15) RDCs can periodically emit beacons via a short range wireless communications protocol such as Bluetooth, the beacons containing information such as RDC identification and location. PDKs detecting these beacons thus are made aware of nearby RDCs. PDKs may reply, informing the RDC that the PDK is within short range wireless communications range, and thereby allowing PDK locations to be tracked.

16) RDCs also can allot specified slots of time for communication with each PDK. This gives each PDK its turn to transfer data with the RDC if desired, preventing multiple PDKs from communicating with an RDC at the same time. In this manner, crosstalk and other interference problems are prevented. Furthermore, as each PDK is assigned its own set of slots for communication, there is no confusion as to which PDK is attempting communication.

17) PDKs of the '533 Patent can also be programmed to remain in a low power mode or sleep mode in which some circuitry, such as its radio frequency transceiver, is powered down. PDKs periodically wake from this low power mode and enter an active mode in which this circuitry is activated for use, to scan for RDC beacons. PDKs thus increase their battery life by only activating some circuitry to perform functions such as scanning for RDC beacons, and sleeping otherwise.

18) The ''533 Patent explicitly defines "time slot" (referred to as "timeslot," which I, and in my opinion a POSITA, would view as equivalent) as "a period of time that information is communicated between two devices." The '533 Patent at Col. 13:20-22. This is exemplified by FIG. 29 of the ''533 Patent:

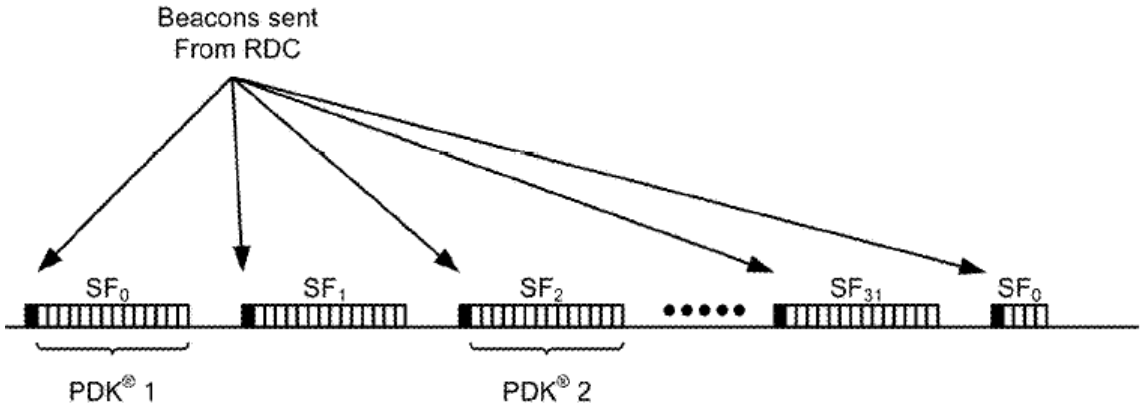

Figure 29

19) Each black rectangle in Fig. 29 represents a beacon sent from an RDC. The time period between two beacons is referred to in the '533 Patent as a superframe SF. The '533 Patent at FIGS. 11-12; Col. 13:45-55. Each superframe SF is divided into a number of smaller time periods, each represented by a white rectangle in FIG. 29, and each referred to as a "time slot." The '533 Patent at Col. 29:13-25. Thus, a superframe SF is made up of a number of successive time slots. This is consistent with my understanding of the term as it is used in the wireless telecommunications arts, and in my opinion, it is consistent with the plain and ordinary meaning of the term as understood by a POSITA.

20) "Time slot information" would then simply be information about a time slot. This is consistent with my understanding of the term as it is used in the wireless telecommunications arts, and in my opinion, it is consistent with the plain and ordinary meaning of the term as understood by a POSITA.

21) Time slots of each superframe SF can be designated for one PDK to communicate with the RDC, as exemplified in FIG. 29. Within a superframe SF, time slots are designated for communication in different directions. Certain time slots are designated for transfer of data from the PDK to the RDC, and certain others are designated for transfer of data from the RDC back to the PDK, until the end of that superframe SF. E.g., the '533 Patent at FIGS. 14, 17; Col. 15:22-27. The '533 Patent thus describes embodiments in which bi-directional communication takes place between PDKs and RDCs, with PDKs and RDCs taking turns sending information to each other during superframes.

22) The '533 Patent also describes other communication configurations in addition to bi-directional communication between a PDK and its beacon sending RDC. For example, the '533 Patent describes communication between PDKs and servers. Here, RDCs transmit beacons to PDKs, which can prompt the PDKs to contact a server directly. For example, the '533 Patent describes an embodiment in which RDCs enable PDK access to a system through a back-end central server. The '533 Patent at Col. 15:17-21. Additionally, the '533 Patent describes an embodiment in which RDCs act as gateways, controlling access to a service offered by, e.g., a server. A POSITA would understand that, after access is granted, servers may provide services to PDKs directly. The '533 Patent at Col. 10:21-38. Accordingly, a POSITA would not read the specification of the '533 Patent to limit a PDK to communicating only with its beacon sending RDC. Rather, a POSITA would read the specification of the '533 patent as encompassing direct communication between PDKs and servers.

23) I understand that Target has defined "time slot information" to be "a predetermined period of time between the start of two successive beacons from the source of such beacons." I believe this construction to be incorrect and unnecessary. As described previously, a POSITA would more likely understand the period of time between two successive beacons in the context of the'533 Patent as a superframe, or set of time slots, not a single time slot. Target's definition of "time slot" is thus inconsistent with the '533 Patent's description of time slot and my understanding of the term as used in the wireless telecommunications arts.

24) Target's definition of time slot is excessively narrow, as it ties the duration of a time slot to beacons sent to a PDK from an RDC, when there is no reason to do so. Its time slot construction implies a limitation of claims 1 and 11 of the '533 Patent to describing only the case of communication between PDKs and RDCs. However, as I stated above, the '533 Patent also discloses embodiments in which communication occurs between a PDK and other devices besides its beacon sending RDC.

25) Claim 1 recites "a server configured to receive data from the second wireless device when in proximity to the first wireless device." A POSITA would understand this to mean that a server configured to receive data from the second wireless device when the second wireless device is in proximity to the first wireless device. Servers are not mobile devices, able to be easily moved into and out of proximity to any other devices. Furthermore, in my experience, a server's purpose is to offer remote services, and thus does not typically have any ability to detect whether any other devices are in physical proximity. In my experience, servers do not typically offer any services that are based on whether another device is in physical proximity. Accordingly, the only reasonable understanding of this portion of claim 1 is that the server's data reception is conditioned on the second wireless device being in proximity to the first wireless device, not the server being in proximity to the first wireless device. I note again here that a POSITA would read the specification of the '533 patent as encompassing direct communication between PDKs and servers.

26) As of the filing date of the '533 patent, cellular telephones had clearly established the capability to communicate wirelessly with servers. At that time, it was also well known that communication between cellular telephones and servers could be, and was often, conducted at least partially through TCP/IP networks, such as the public Internet, which were well known to employ many different network devices such as routers, base stations, and the like. Thus, as of the filing date of the '533 patent, no POSITA would have expected a cellular telephone, such as a PDK, to communicate with a server without adequate network infrastructure, for example using infrastructure such as RDCs to reach a server.

27) For these same reasons, I also understand the term "sending data to a server, when in proximity to the first wireless device" of claim 11 of the '533 Patent to refer to sending data to a server, when the entity performing the method of claim 11 is in proximity to the first wireless device.

28) Claim 7 of the '533 Patent recites "further the server is configured to gather information from the second wireless device." The improper grammar of this term appears to me, and would appear to a POSITA, as a simple typographical error. It is thus clear to me, and would be clear to a POSITA, that this term means "wherein the server is further configured to gather information from the second wireless device."

I declare under the penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed this 24th day of May 2021 in Colorado Springs, CO.

Kurt Humphrey

Appendix A

Kurt D. Humphrey

Microelectronics and Wireless Networking Technology Expert

After graduating with his B.S. in Ceramic Engineering, Mr. Humphrey accepted a Product Development engineering position with General Motors' AC Spark Plug division where he developed and patented the seminal process for PVD deposition of Pt catalytic coatings on partially-stabilized zirconia oxygen sensors for state-of-the art automotive emission control systems. Kurt was subsequently awarded a GM Graduate Study Fellowship and continued research in the area of automotive electronics with the development of **novel methods for fabricating multilayer ceramic capacitors** and other piezoelectric components through funding by General Motors Research Laboratories. After completing his M.S. degree in Ceramic Engineering, Kurt joined Delco Electronics (Delphi) Division of General Motors where he led process development and engineering in the areas of Czochralski (Cz) single-crystal silicon growth and semiconductor device/IC fabrication for bipolar, MOS, and silicon vacuum transducer (MAP sensor) products.

Mr. Humphrey's expertise in materials and microelectronics subsequently led to assignments as Thin Films Process Development Manager where he developed and transferred to production the PVD tantalum salicide (TaSi) process used in AT&T's and Bell Labs' DRAM memory products. Kurt subsequently served as Submicron Process Integration Manager at N.V. Philips Research Labs in Eindhoven, NL including development of next-generation isolation, contact plug, via metallization and ILD gap-fill processes for state-of-the-art SRAM production. While at Philips, Kurt collaborated with engineers at AMD, Intel, TSMC, Texas Instruments, and Siemens on advanced materials development and IC process/fabrication technology through formal technology transfer agreements between the companies.

Mr. Humphrey came to Colorado Springs as Process Integration Manager for United Technologies Microelectronics Center (UMTC, formerly MOSTEK) developing state-of-the-art radiation-hardened CMOS, amorphous silicon anti-fuse, and deep-trench fully-isolated, complimentary bipolar silicon-on insulator (SOI) process technologies. Kurt transferred to Rockwell Semiconductor Systems/Conexant where he served as Advanced Process Integration Manager for 90nm CMOS pilot production. Later, with Rockwell, Kurt developed and patented a commercial process for manufacturing bulk micro-machined MEMS gyros in cooperation with Boeing. During his long tenure in the industry, Mr. Humphrey worked with key semiconductor and telecom equipment and materials vendors including Applied Materials, AT&T, ASML, Ericsson, Huawei, Nokia, LAM, Novellus, ULVAC, SOITEC, Shin Etsu (SEH), JSR, TOK, Samsung, Sumitomo, Veeco, and many others to develop next-generation components, designs and fabrication technologies.

Kurt has spent the past 20+ years as a full-time IP consultant and subject matter expert (SME) in microelectronics and wireless telecom technologies. Kurt has served as a consulting and/or testifying expert in multiple lawsuits including an ITC patent infringement case between HP and Acer and **provided trial testimony as the expert for the plaintiff (the Houston Rockets organization) in a 2012 product liability case involving LED lighting technology in 2012**. The jury found for the Plaintiff. Most recently, Kurt has provided expert analyses, reports and declarations in support of wireless telecom IPRs, e.g. IPR2017-01178, 1885, 1886 and 1889, and other actions before the USPTO's Patent Trial and Appeal Board (PTAB). Mr. Humphrey has been engaged numerous times to provide forensic/reverse engineering services, primarily in the areas of commercial and industrial electronics and high-tech materials and has analyzed literally thousands of patents and countless patent portfolios for clients in the Global High-tech Top 100.

In addition to his consulting work, Mr. Humphrey currently serves as Adjunct Professor of Chemistry in the College of Engineering at Colorado Technical University.

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PROFESSIONAL EXPERIENCE

IP *Enginuity* LLC. **2005-Present**

Managing Director/Principal Technologist

- Comprehensive Engineering Services Provider for the Intellectual Property and Patent Asset Management, Licensing, Litigation and Technology Transfer Industries.
- Prepare strategies and manage engineering services relating to IP asset and patent evaluation; reverse/forensic engineering and re-engineering; patent enforcement, assertion and licensing; portfolio mining; prior art searches; technology transfer; and IP litigation support.
- Primary technical contributor on projects relating to advanced/engineered materials; wireless telecom and networking protocols and standard essential patents (SEPs), semiconductor devices, processes and systems; consumer electronics, photonics and opto-electronic devices; MEMS and sensors; flat panel displays (FPDs), and biotech/medical products and systems.
- Expert witness experience in patent infringement litigation

TAEUS International Corp. **1999 – 2005**

Director, Engineering Services

- Managed patent evaluation and reverse engineering projects from the initial proposal through project completion and final review.
- Serve as a primary technical contributor/SME on wireless telecom/networking standards incl. 802.11, Bluetooth and 3G/4G cellular and associated SEPs, optical networking and opto-electronic/photonics components semiconductor, FPD technologies, e.g. LCD, FLCD, plasma and LED/OLED, solid state DFB/quantum well lasers, photonics/opto-electronics, MEMS, sensors,) etc. and biotech related projects.
- Specific responsibilities include client interface, project definition, cost, resource and schedule planning, technical input, supervision of staff engineers, external consultants and labs, patent evaluation, claim chart construction, and technical report writing.
- Clients included many Global 100 high tech companies and leading U.S. patent law firms.

Rockwell Semiconductor Systems/Conexant Systems **1995 - 1999**

Advanced Process Development Manager

- Assess new business opportunities, perform technical audits and generate comprehensive business and financial plans for review and approval by Rockwell CEO and senior staff.
- Primary focus on state-of-the-art semiconductor products e.g., Power-Trench Diodes and Trench IGBTs, CMOS imagers and MEMS gyros.
- Coordinate design rules, mask/reticle specifications, test chip design/layout, process qualification and transfer to production for 90nm CMOS process development in Rockwell's Advanced Process Technology (APT) department in Newport Beach.

Process Integration Manager

- Demonstrated first fully-functional Trench IGBTs and silicon MEMS gyro using 125mm substrates.
- Authored 3 MEMS and 1 SAW filter disclosures; 1 MEMS patent issued, others pending.
- Successful completion of comprehensive STI and 90nm CMOS process development test chips in record time to support an aggressive 90nm qualification schedule.

United Technologies Corp. (UTMC) **1989 – 1995**

Process Integration Manager

- Direct next-generation CMOS and bipolar process technology development. Development projects included: ACUTE (advanced dielectrically-isolated, complementary bipolar linear array process on

SOI), UTERPROG (radiation-hardened 1.0µ CMOS PAL technology utilizing vertical amorphous Si antifuses), and UTERTLM (1.0µ triple-level metal, rad-hard CMOS)

- Developed advanced amorphous silicon metal-to-metal antifuse technology to support 256k RHPROM and RHPAL field programmable products; 2 patents issued.
- Developed novel trench-isolated, complementary bipolar SOI process, 1 patent issued

Philips Research Labs (Eindhoven, The Netherlands) 1986 – 1989

Process Integration Manager

- Direct development of 0.7µ CMOS process from R&D phase through final product qualification as part of the Philips/Siemens "Mega" project. Project deliverables included commercial 1M SRAM and 4M DRAM products.
- Directed activities of 10 senior technologists.
- Developed first sub-micron CMOS process utilizing retro-wells, suppressed-BB LOCOS, salicide with $TiSi_2$ local interconnect, W plugs and I-line lithography.
- Integration team produced Philip's first fully-functional 1M SRAM using state-of-the-art 0.7µ CMOS process (C1DM)

AT&T Technologies 1983 – 1986

Process Engineering and Yield Enhancement Manager

- Coordinate DRAM process transfer from R&D to fab, and direct yield enhancement activities for 256k DRAM production in new 125mm line (KC-1).
- Section Leader for Thin Films/Ion Implantation Engineering
- Key contributor in successful start up of new 125 mm high volume memory fab (KC-1);
- Representative on corporate committee for thin film metallization processes and invited speaker at SEMI/ASTM meeting on PVD target specifications.

DELCO Electronics Div. General Motors 1980 – 1983

Process Development Engineer (Silicon Crystal Growing, Bipolar and MOS Fabs)

- Provide production engineering support, initially for Si crystal growing area, and later for MOS diffusion and LPCVD areas
- Evaluated external silicon wafer suppliers and introduced intrinsic-gettered substrates into MOS fab resulting in an average 7% increase in die yield across all devices

AC Spark Plug Div., General Motors 1978 – 1980

Associate Process Development Engineer

- Developed process for depositing Pt catalytic thin films onto partially-stabilized zirconia oxygen sensors
- Key investigator and inventor on U.S. patent: "Electrode Sputtering Process for Exhaust Gas Oxygen Sensor"
- 1979 GM Graduate Study Fellowship Award

EDUCATION and ACADEMIA

M.S. Ceramic Engineering, University of Missouri - Rolla
B.S. Cum Laude, Ceramic Engineering, University of Missouri – Rolla
Current Adjunct Professor of Chemistry in the College of Engineering at Colorado Technical University-Colorado Springs.

U.S. PATENTS:

6,337,027 Microelectromechanical device manufacturing process
5,759,876 Method of making an antifuse structure using a metal cap layer
5,658,819 Antifuse structure and process for manufacturing the same
5,344,785 Method of forming high speed, high voltage fully isolated bipolar transistors on a SOI substrate
4,253,931 Electrode sputtering process for exhaust gas oxygen sensor

HONORS

General Motors Graduate Study Fellowship – 1979
United Technologies Silver Quill Award – 1994
Rockwell Outstanding Achievement Award – 1998

PROFESSIONAL MEMBERSHIPS

Institute for Electrical and Electronics Engineers (IEEE) / Electron Devices Society
Colorado Photonics Industry Association
Licensing Executive Society (LES)
Intellectual Property Owners Association (IPO)
Society for Optical Engineering (SPIE)
Intellectual Asset Management (IAM)